



Department of Energy
Savannah River Operations
Office P O Box A
Aiken, South Carolina
29802

ARF-022913

SEP 29 2020

Ms. Susan Fulmer, P. G., Manager
Federal Facility Agreement Section
Division of Site Assessment, Remediation and Revitalization
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Mr. Jon Richards
Acting Savannah River Site Remedial Project Manager
Superfund Division
U. S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: 5-Year Monitoring Report (Data Summary Letter) for the K-Area Groundwater Operable Unit, 2016 through 2020, SEMS Number: 99

Reference: Letter, B. T. Hennessey (DOE) to S. B. Fulmer (SCDHEC) and R. H. Pope (EPA), *Pre-Workplan Characterization Data Reporting for the K-Area Groundwater Operable Unit (OU) (Including K-Area Tritium Anomaly) (NBN) CERCLIS Number: 99* (IACD-15-144, dated May 14, 2015)

Per the referenced letter, the U. S. Department of Energy (DOE) is submitting the groundwater monitoring report (sampling summary) for your review. As stated in the referenced letter, sampling results will be presented in five (5) year data summary letter reports. This is the first data summary letter report to be submitted since the sampling summary was implemented with a submittal date of September 30, 2020. This letter is transmitting the *5-Year Monitoring Report (Data Summary Letter) for the K-Area Groundwater Operable Unit, 2016 through 2020*.

Please review the information and provide any comments that you may have within one hundred twenty (120) days of receipt. The effort and time that the South Carolina Department of Health and Environmental Control and the U. S. Environmental Protection Agency have given on the subject operable unit are greatly appreciated.

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Questions from you or your staff may be directed to me at (803) 952-8365, or DOE Program Manager, Mr. Philip Prater, at (803) 952-9333.

Sincerely,

**BRIAN
HENNESSEY**

Digitally signed by BRIAN
HENNESSEY
Date: 2020.09.24 16:12:58
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Brian T. Hennessey
SRS Remedial Project Manager
Infrastructure and Area Completion Division

IACD-20-182

Enclosure: Attachment 1. KAGW 5-Year Data Table 2016 through 2020

cc w/o encl:

J. Blalock, SCDHEC-Columbia
S. French, SCDHEC-Columbia
M. Reece, SCDHEC-Columbia
G. K. Taylor, SCDHEC-Columbia
T. Fuss, SCDHEC–Aiken Environmental Affairs Office
G. N. O’Quinn, SCDHEC - Aiken Environmental Affairs Office
B. Cameron, SCDHEC–Aiken Environmental Affairs Office
R. H. Pope, EPA-Atlanta

cc w/encl:

M. McRae, TechLaw, Inc.

Ms. Susan Fulmer
Mr. Jon Richards

5-Year Monitoring Report (Data Summary Letter) for the K-Area Groundwater Operable Unit, 2016 through 2020

Introduction

A webcast meeting was held on April 22, 2015 between the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) to discuss the current groundwater conditions and to develop a path forward for the K-Area Groundwater Operable Unit (Including K-Area Tritium Anomaly) (KAGW OU) (*K-Area Groundwater Data Review* [ERD-EN-2015-0016, April 22, 2015]). Groundwater and surface water data and historical events and investigations with respect to the KAGW OU were discussed.

The Federal Facility Agreement Appendix E Work Plan Characterization Field Start date for the KAGW OU is September 2042. All parties agreed that pre-work plan characterization data would be beneficial in advance of the remedial investigation and final remedial decision to document contaminant conditions and trends. USDOE, USEPA, and SCDHEC agreed that annual sampling of a subset of monitoring wells (six) and surface water stations (seven) would provide long-term trend data to support further characterization efforts and to allow for monitoring of the known tritium and volatile organic compound (VOC) plumes. The sampling summary provided at the April 2015 meeting identifies the requirements of the KAGW OU monitoring (*K-Area Groundwater Operable Unit Sampling Summary* [ERD-EN-2015-0021, Revision 0, May 2015]). Groundwater and surface water samples are collected annually, and the data provided in five (5) year data summary letter reports. Table 1 lists the monitoring wells and surface water stations that are sampled, and the constituents monitored. This letter report is the first 5-year data summary letter report to be submitted for the KAGW OU. This data summary letter discusses the data for the period of 2016 through 2020.

KAGW History

The KAGW OU is located in the Pen Branch watershed in the south western portion of the Savannah River Site (SRS). Groundwater from K-Area discharges westward to Indian Grave Branch, a major tributary to Pen Branch.

K-Reactor achieved criticality in October 1954 and was put into stand-by status in 1988 while testing and upgrade activities were performed. K-Reactor was temporarily restarted in 1992 and only operated at low power for a short time. Based on historical monitoring data, it is known that groundwater and surface water in Indian Grave Branch and Pen Branch is contaminated with tritium. The K-Area Reactor Complex is the only source of tritium contamination to the Pen Branch stream system. Other radiological constituents have not been detected at elevated levels. Historically, a few wells have shown detections of VOCs, specifically trichloroethylene (TCE) and tetrachloroethylene (PCE), above maximum contaminant levels (MCLs).

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Over the operational period, tritium-contaminated water from the K-Area Reactor Complex was discharged to the K-Area Reactor Discharge Canal, the K-Area Reactor Seepage Basin (904-65G), and the K-Area Containment Basin (904-88G). Other potential tritium sources include the 105-K Reactor Building, including the K-Area Disassembly Basin, and associated process sewer lines, potential leaks from the 106-K Process Water Storage Tank, and two known leaks around the tritium distillation columns. The potential contaminant sources to groundwater are identified on Figure 1 and depict two distinct tritium plumes, one originating from the K-Area Containment Basin (904-88G), and the other from the K-Area Reactor Complex.

KAGW OU Monitoring Results

A field measurement and analytical data table is provided in Attachment 1. The results are summarized below. A tritium plume map is provided in Figure 1.

KAGW OU Tritium Results

Monitoring Well Results

Tritium is monitored in five monitoring wells surrounding and downgradient of the K-Area Disassembly Basin (KDB 1, KDB 2, KDB 3, KDB 4, and KDB 5). Over the last five years, the majority of the tritium results were either non-detect or at levels below the MCL (20 picocuries per milliliter [pCi/mL]). One well, KDB 2, displayed tritium contamination above the MCL but has shown a steady decreasing trend with concentrations of 446 pCi/mL in 2016 to 92.6 pCi/mL in 2020. Time trend plots of tritium concentrations at the KDB series wells can be seen in Figures 2, 3, and 4.

Well KRB 19D monitors tritium in groundwater directly downgradient of the K-Area Containment Basin (904-88G). Historically, this well displayed high concentrations of tritium (>90,000 pCi/mL) but has exhibited a steadily decreasing trend due to the cessation of tritium-contaminated water discharges to the basin. Tritium concentrations were detected at 2,090 pCi/mL in well KRB 19D in 2020 (Figure 4).

Surface Water Results

All seven surface water stations, located along Indian Grave Branch (five: KSW-01, KSW-05, KSW-06, KSW-07, and KSW-16) and Pen Branch (two: KSW-17 and KSW-18), are monitored annually for tritium. These results are indicators of the tritium transport in groundwater which discharges to surface water in Indian Grave Branch. Upgradient surface water location KSW-01 continues to show low estimated concentrations or is non-detect for tritium (Figure 5).

Surface water stations KSW-05 and KSW-06 monitor where the K-Area Containment Basin (904-88G) tritium plume discharges to Indian Grave Branch. Tritium concentrations at KSW-05 were relatively stable but have displayed an increasing trend over the last 3 years (Figure 5). However, downgradient surface water station KSW-06 displays a decreasing trend which indicates that the impact of tritium from the K-Area Containment Basin (904-88G) on Indian Grave Branch may be decreasing overall.

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Surface water station KSW-07 monitors surface water downgradient where the K-Area Containment Basin (904-88G) discharges into Indian Grave Branch and upgradient of the K-Area Reactor Complex tritium plume. The tritium concentration at surface water station KSW-07 was 40.2 pCi/mL in 2020, approximately half of the tritium concentration observed at station KSW-06 (Figure 6). Downgradient surface water station KSW-16 captures discharges from the K-Area Reactor Complex tritium plume and the surface water discharges from minor tributaries which have previously shown higher tritium concentrations than Indian Grave Branch. The tritium concentration at KSW-16 during 2020 was 51.4 pCi/mL. The tritium concentrations at this surface water station show an overall decreasing trend, indicating the impact of the K-Area Reactor Complex tritium plume on Indian Grave Branch is also decreasing.

The two surface water stations located in Pen Branch after the confluence of Indian Grave Branch (KSW-17 and KSW-18) (Figure 1) both display decreasing tritium concentrations (Figures 7 and 8). Concentrations in the furthest downgradient surface water station, KSW-18, are lower than in KSW-17. Both locations have been below the MCL since 2015 and were less than 10 pCi/mL in 2020.

Tritium Flux Calculations

Stream flow measurements are also collected annually during sampling at surface water stations KSW-07, KSW-17, and KSW-18. This annual measurement is used to estimate the mass flux of tritium being discharged to Indian Grave Branch from both the K-Area Containment Basin (904-88G) plume and the K-Area Reactor Complex plume, which subsequently converges with Pen Branch. An estimate of the yearly tritium stream flux is calculated as follows:

$$\text{Stream Flow} \frac{\text{ft}^3}{\text{sec}} \times 28316.8 \frac{\text{mL}}{\text{ft}^3} \times 31,557,600 \frac{\text{sec}}{\text{year}} \times \text{Surface Water Concentration} \frac{\text{pCi}}{\text{mL}} \times 10^{-12}$$

$$= \text{Tritium Stream Flux} \frac{\text{Ci}}{\text{year}}$$

Direct stream flow measurements are not available for 2016 due to a records issue; however, the 2016 stream flow was estimated by averaging the 2014 and 2017 stream flow measurements. Station KSW-18 did not have a stream flow measurement during 2014, so no estimated measurement was assigned. Table 2 presents the tritium flux calculations for the streams on an annual basis. Based on the placement of the surface water stations upgradient and downgradient of the two tritium plumes, estimates on the flux from both plumes have been calculated.

In 2016 through 2018, the K-Area Reactor Complex tritium plume appeared to contribute the most tritium in the stream system. In 2019 and 2020, the K-Area Containment Basin (904-88G) flux increased as the K-Area Reactor Complex plume decreased. During 2020, the K-Area Containment Basin (904-88G) plume had an estimated discharge of 64 curies (Ci), and the K-Area Reactor Complex plume had an estimated discharge of approximately 32 Ci. Differences between KSW-17 and KSW-18 are minimal (<20%) indicating there are no other contributions of tritium to the Pen Branch system. These differences likely reflect measurement uncertainty. Overall, the K-Area tritium fluxes to the streams indicate a decreasing trend, which is consistent with the decreasing concentration trend.

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KAGW VOC Results

VOCs (TCE, PCE, cis-1,2-dichloroethylene, and vinyl chloride) are sampled annually at monitoring wells KDB 1 and KDB 2 and also at surface water station KSW-16. Only monitoring well KDB 1 displays PCE concentrations above the groundwater MCL of 5 micrograms per liter ($\mu\text{g/L}$) with a concentration of 6.14 $\mu\text{g/L}$ during 2020. VOC concentrations display a decreasing trend (Figure 8). TCE was non detect for the past five years at KDB 1. Groundwater concentrations at monitoring well KDB 2 show detections of both PCE and TCE, but at levels below the 5 $\mu\text{g/L}$ MCL and also display decreasing trends (Figure 9). Degradation products cis-1,2-dichloroethylene and vinyl chloride were not detected in any groundwater samples.

Additionally, no VOCs were detected at surface water station KSW-16 over the last 5-year period.

Summary and Future Sampling and Reporting

Groundwater and surface water tritium concentrations and stream mass flux calculations indicate an overall decreasing trend from the two combined sources in K-Area, the K-Area Containment Basin (904-88G) and the K-Area Reactor Complex. Only one well, KDB 1, shows an exceedance of VOCs (PCE) above MCLs in groundwater; however, PCE concentrations at KDB 1 are decreasing. VOCs are not detected in surface water. These data indicate it is highly likely that there are no continuing sources of contaminants to groundwater.

No changes are proposed for the sampling and analysis for KAGW OU. Monitoring and reporting will continue per the *K-Area Groundwater Operable Unit Sampling Summary* (ERD-EN-2015-0021, Revision 0, May 2015). The next groundwater summary letter report will be submitted by September 30, 2025. As stated in the Sampling Summary conditions, USDOE, USEPA, and SCDHEC will be notified if any of the following conditions occur:

- >25% increase in concentration of tritium at surface water sample locations KSW-17 and KSW-18 over a two-year period;
- >50% increase in concentration of tritium at all other sample locations over a two-year period; or
- Exceedance of any VOC MCL in surface water.

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Table 1: KAGW OU Pre-Work Plan Characterization Monitoring Stations and Analyses

Station	Station Type	UTM NAD 27 (Zone 17)		Analyses		Flow Measurements
		Easting	Northing	Tritium	VOCs	
KDB 1	Monitoring Well	437993.40	3674714.78	X	X	
KDB 2	Monitoring Well	437973.63	3674646.42	X	X	
KDB 3	Monitoring Well	438031.36	3674645.96	X		
KDB 4	Monitoring Well	437972.69	3674600.54	X		
KDB 5	Monitoring Well	437896.33	3674644.76	X		
KRB 19D	Monitoring Well	437657.94	3675062.46	X		
KSW-01	Surface Water	437619.36	3675394.90	X		
KSW-05	Surface Water	437202.50	3675129.99	X		
KSW-06	Surface Water	437034.98	3674820.02	X		X
KSW-07	Surface Water	436911.44	3674435.281	X		
KSW-16	Surface Water	437057.55	3673880.22	X	X	
KSW-17	Surface Water	437772.86	3671710.99	X		X
KSW-18	Surface Water	436029.40	3669064.80	X		X

VOCs include trichloroethylene (TCE), PCE, Cis-1,2-dichloroethene (DCE), and Vinyl Chloride.

Table 2: Tritium Stream Flux Calculations (Ci/year)

Station	Containment Basin Plume Contribution			Reactor Area Plume Contribution (KSW-17 - KSW-06)
	KSW-06	KSW-17	KSW-18	
2016	86.90	315.02	NA	228.11
2017	63.08	415.17	360.84	352.09
2018	53.67	142.47	142.60	88.80
2019	111.81	182.27	220.25	70.46
2020	64.00	95.88	107.47	31.88

NA – Not available

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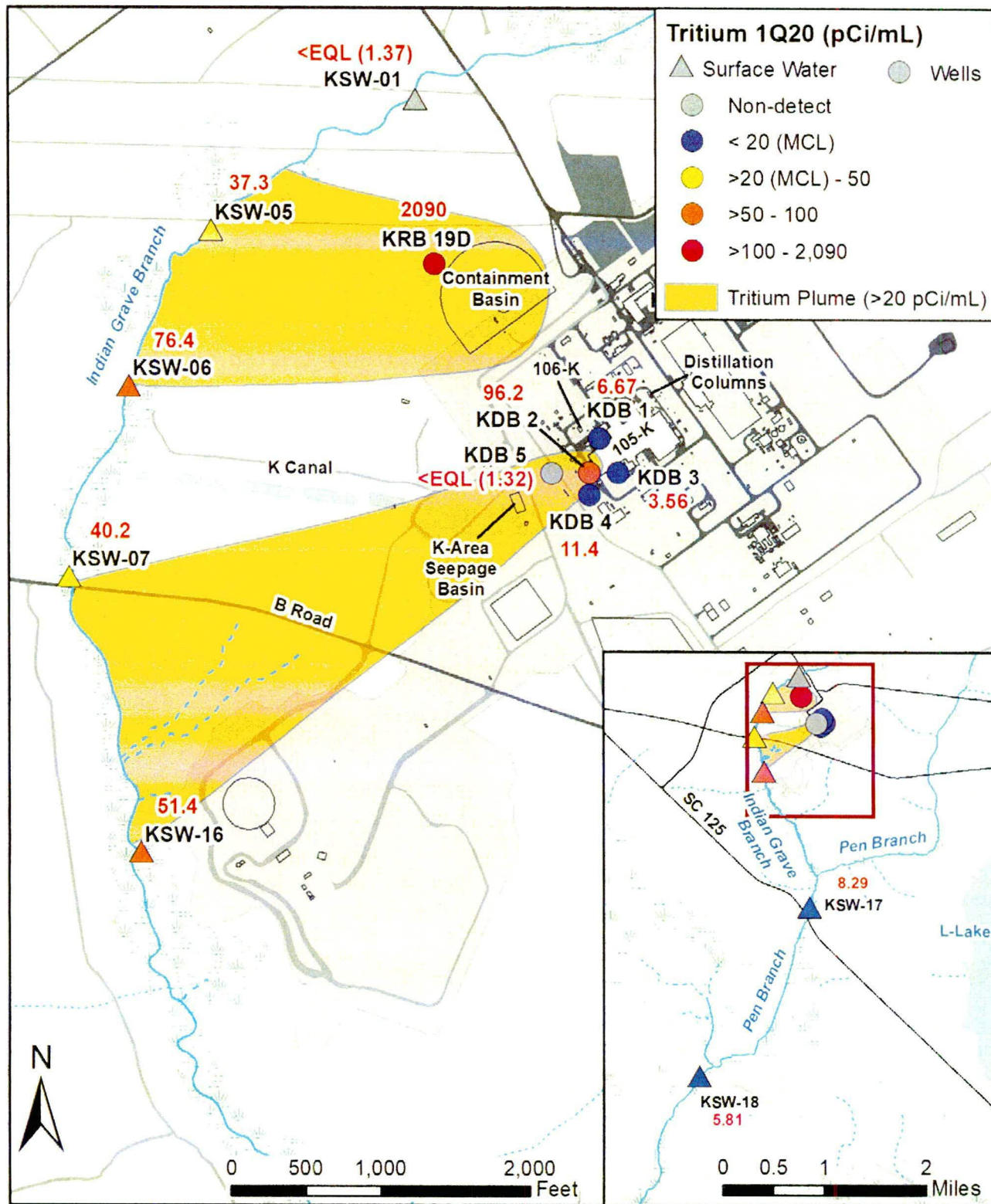


Figure 1: 1Q2020 Tritium Plume and Concentrations at KAGW OU

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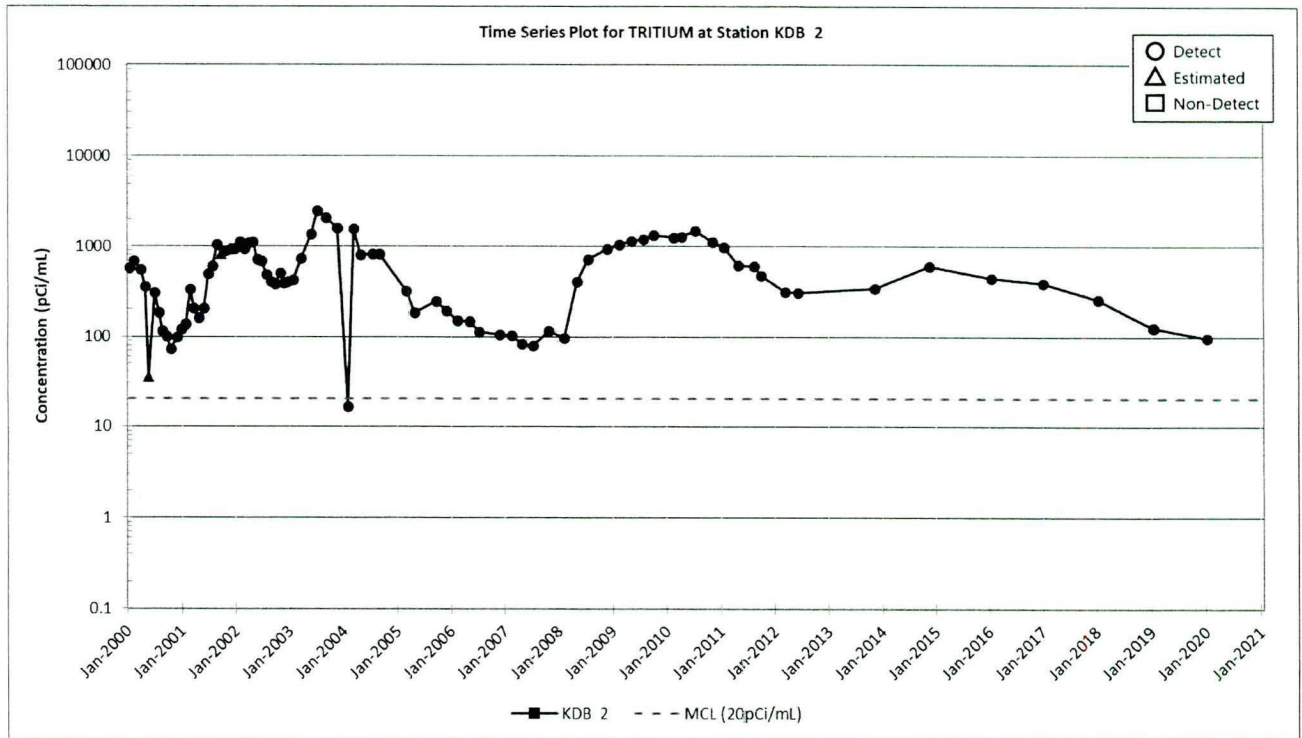
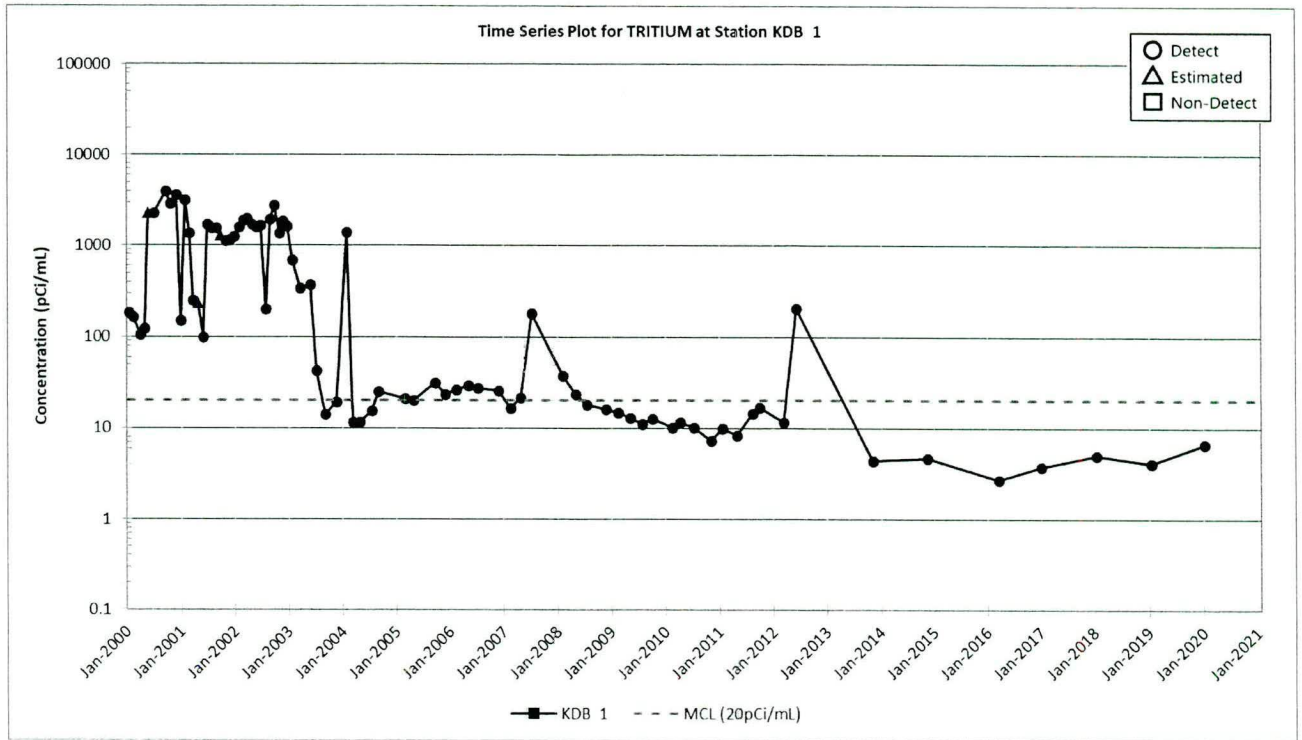


Figure 2: Tritium Concentration Trends at Wells KDB 1 and KDB 2

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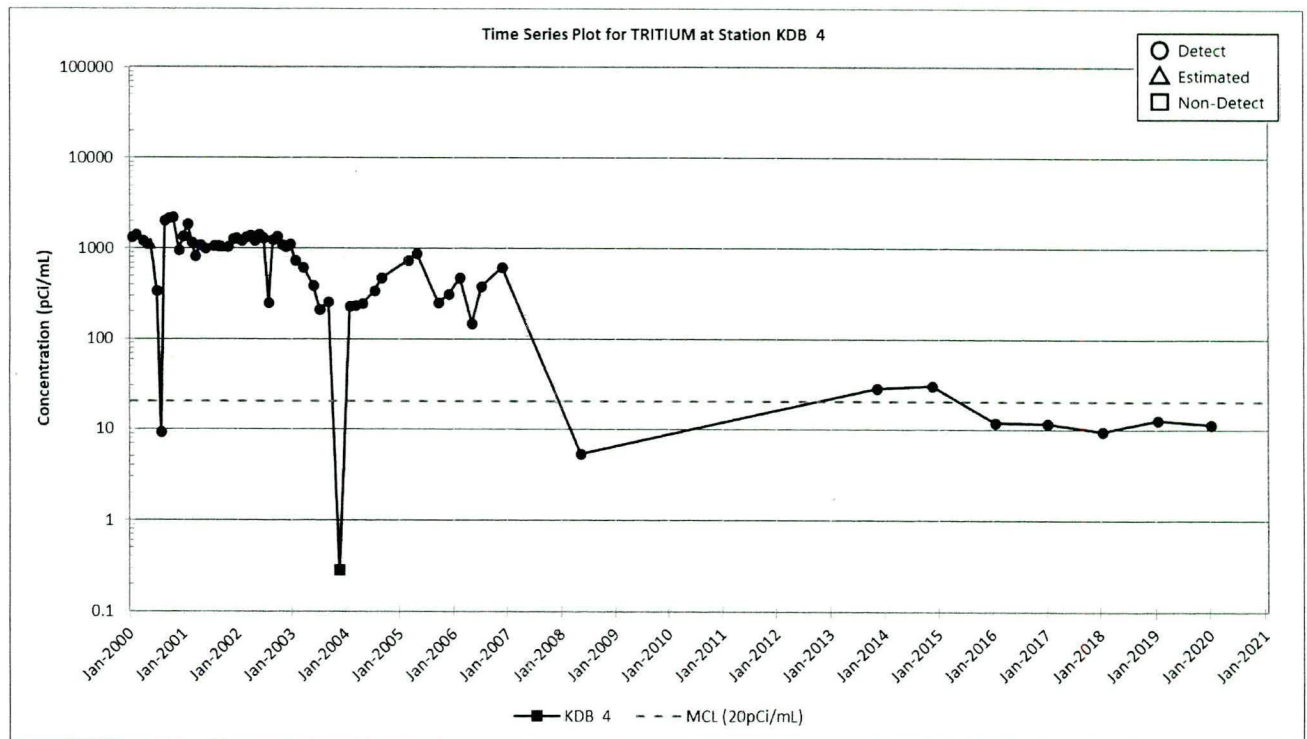
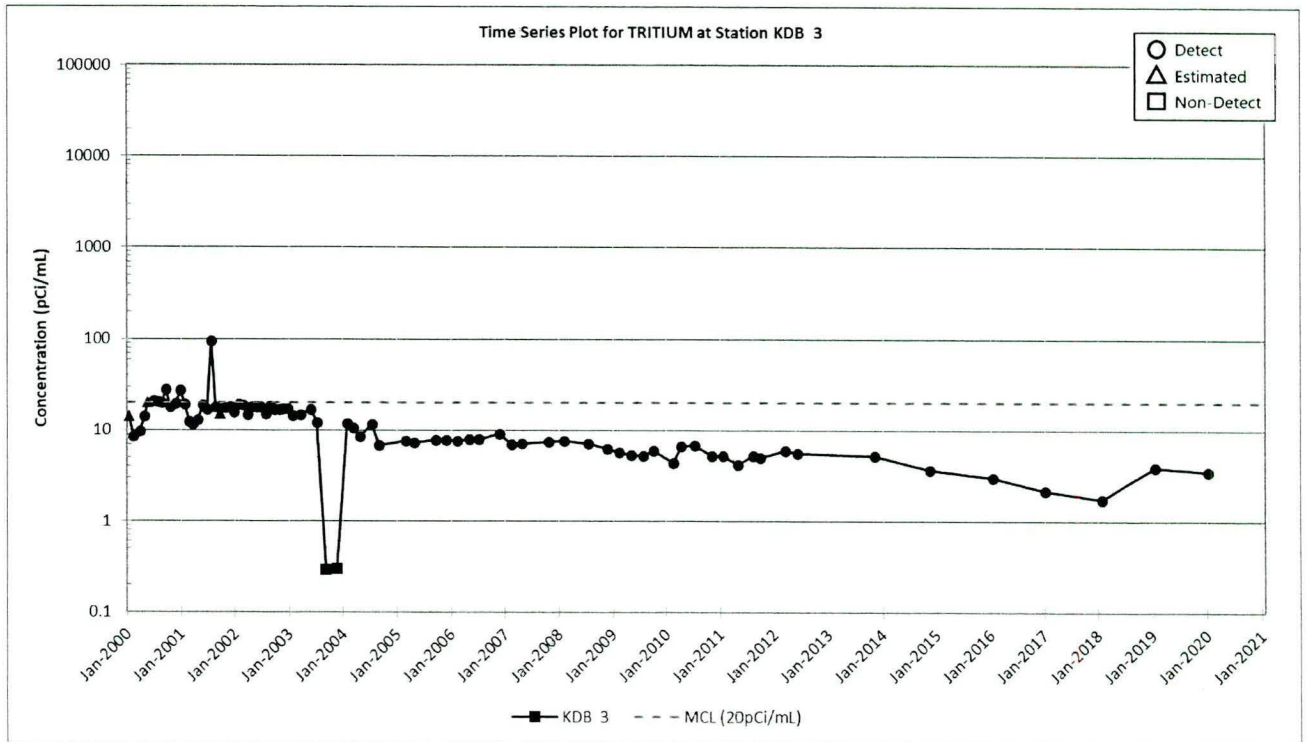


Figure 3: Tritium Concentration Trends at Wells KDB 3 and KDB 4

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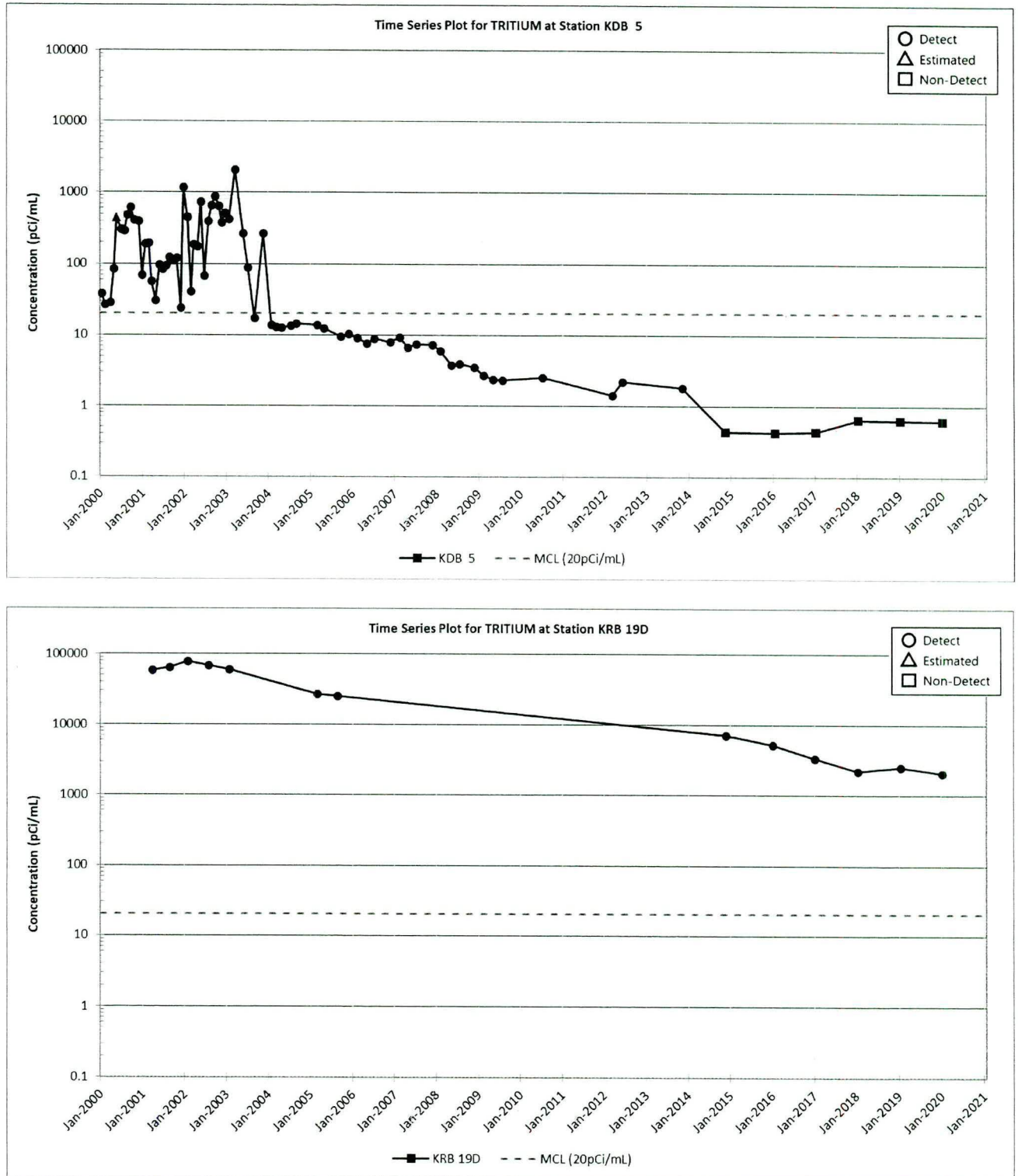


Figure 4: Tritium Concentration Trends at Wells KDB 5 and KRB 19D

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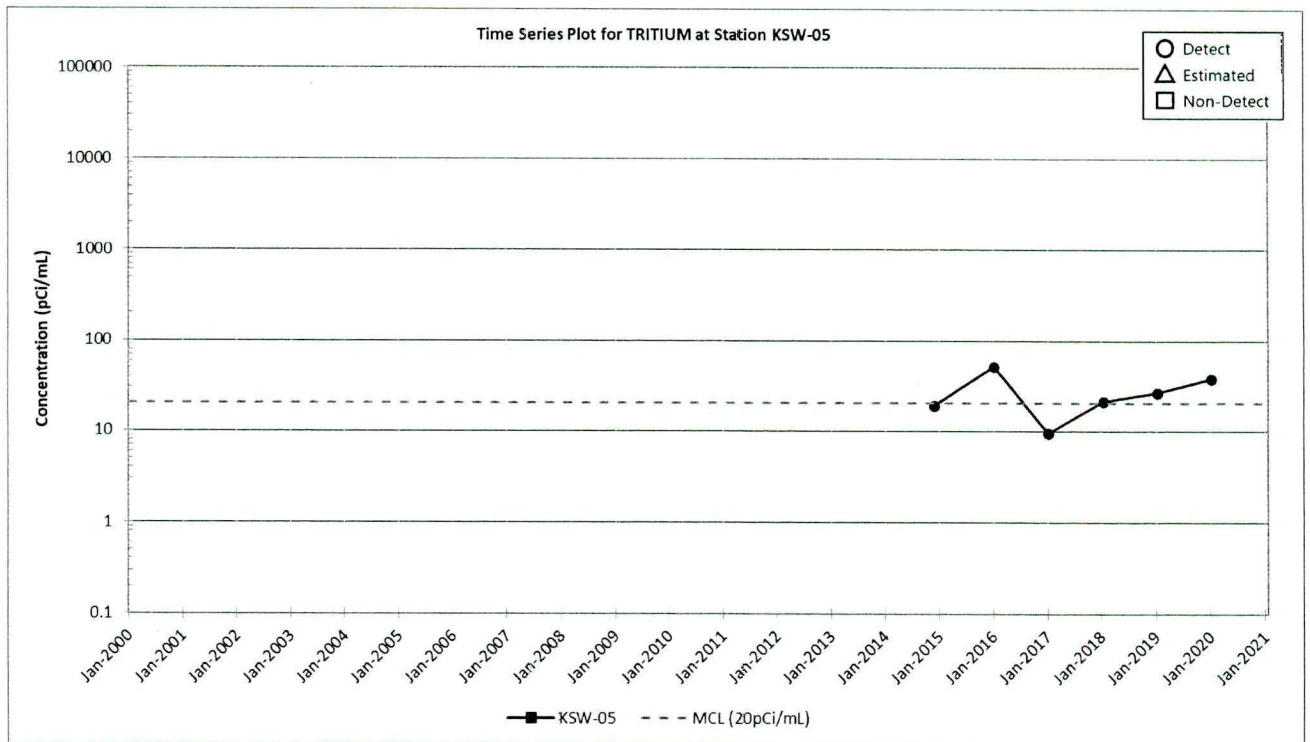
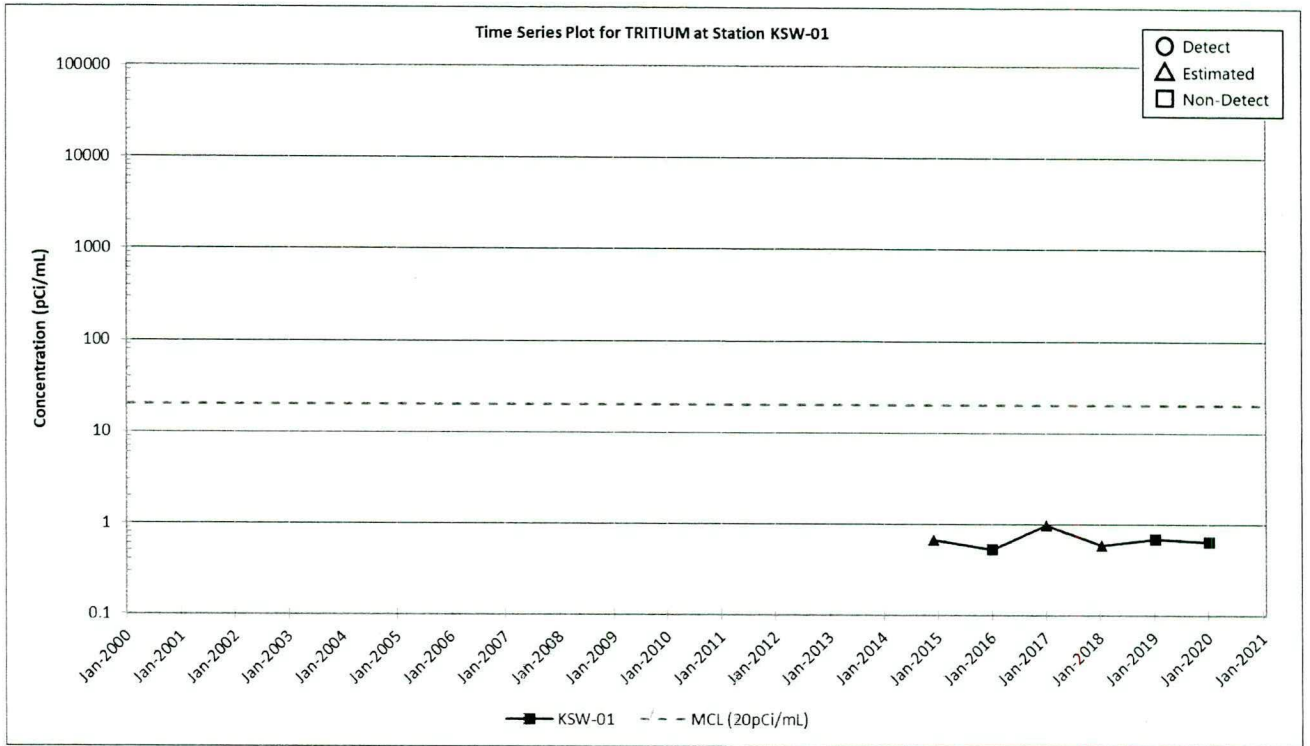


Figure 5: Tritium Concentration Trends at Surface Water Station KSW-01 and KSW-05

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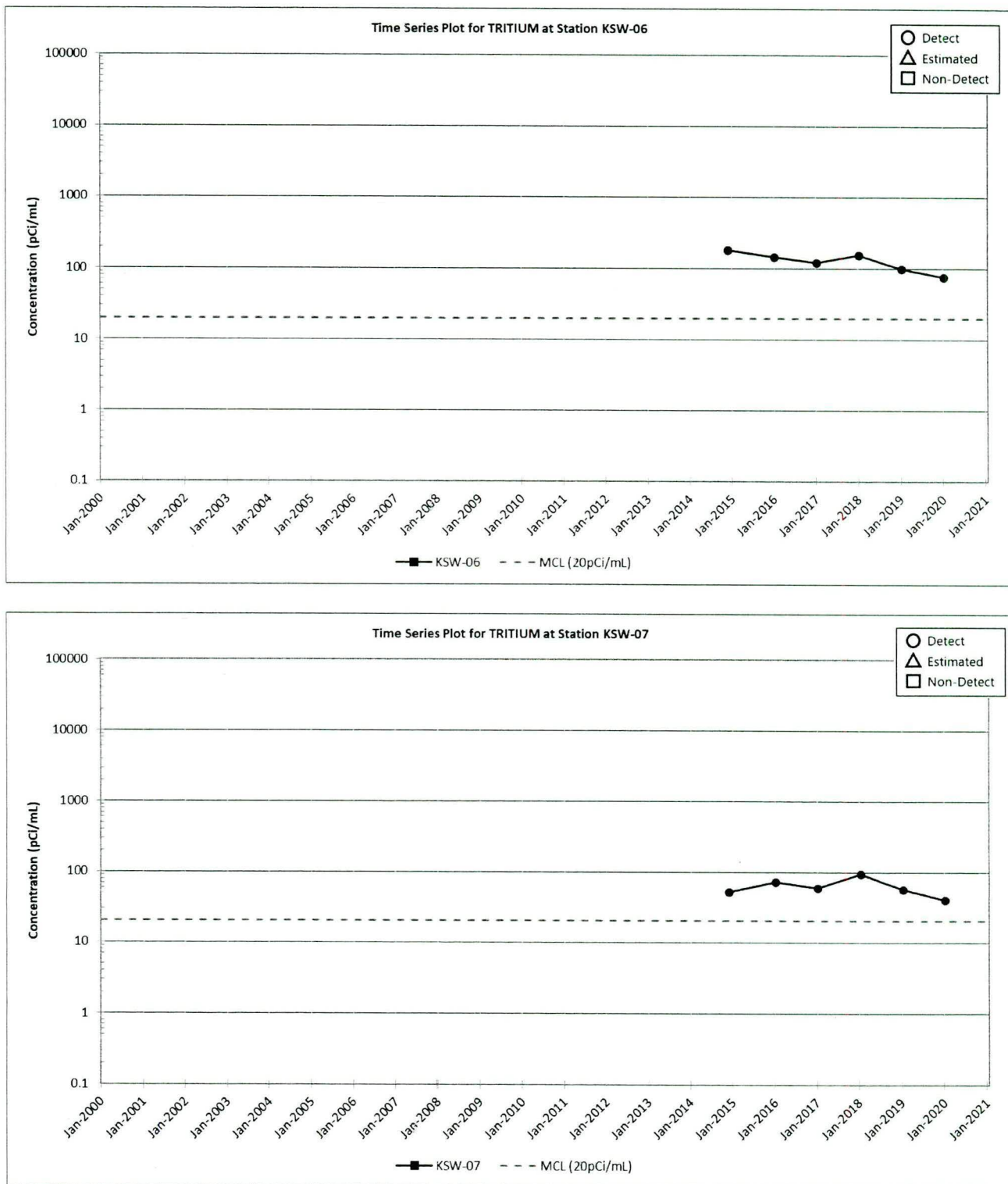


Figure 6: Tritium Concentration Trends at Surface Water Station KSW-06 and KSW-07

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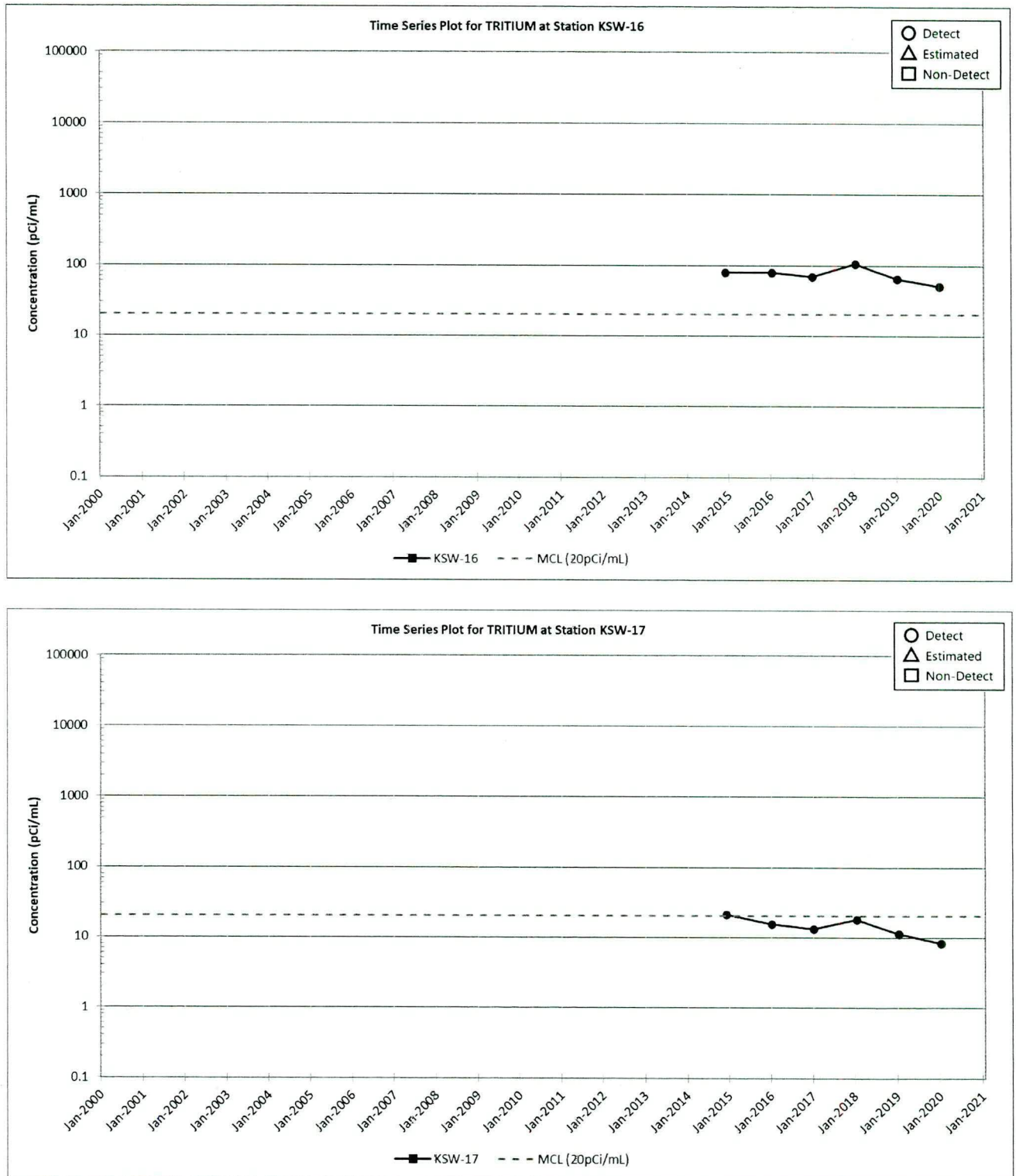


Figure 7: Tritium Concentration Trends at Surface Water Station KSW-16 and KSW-17

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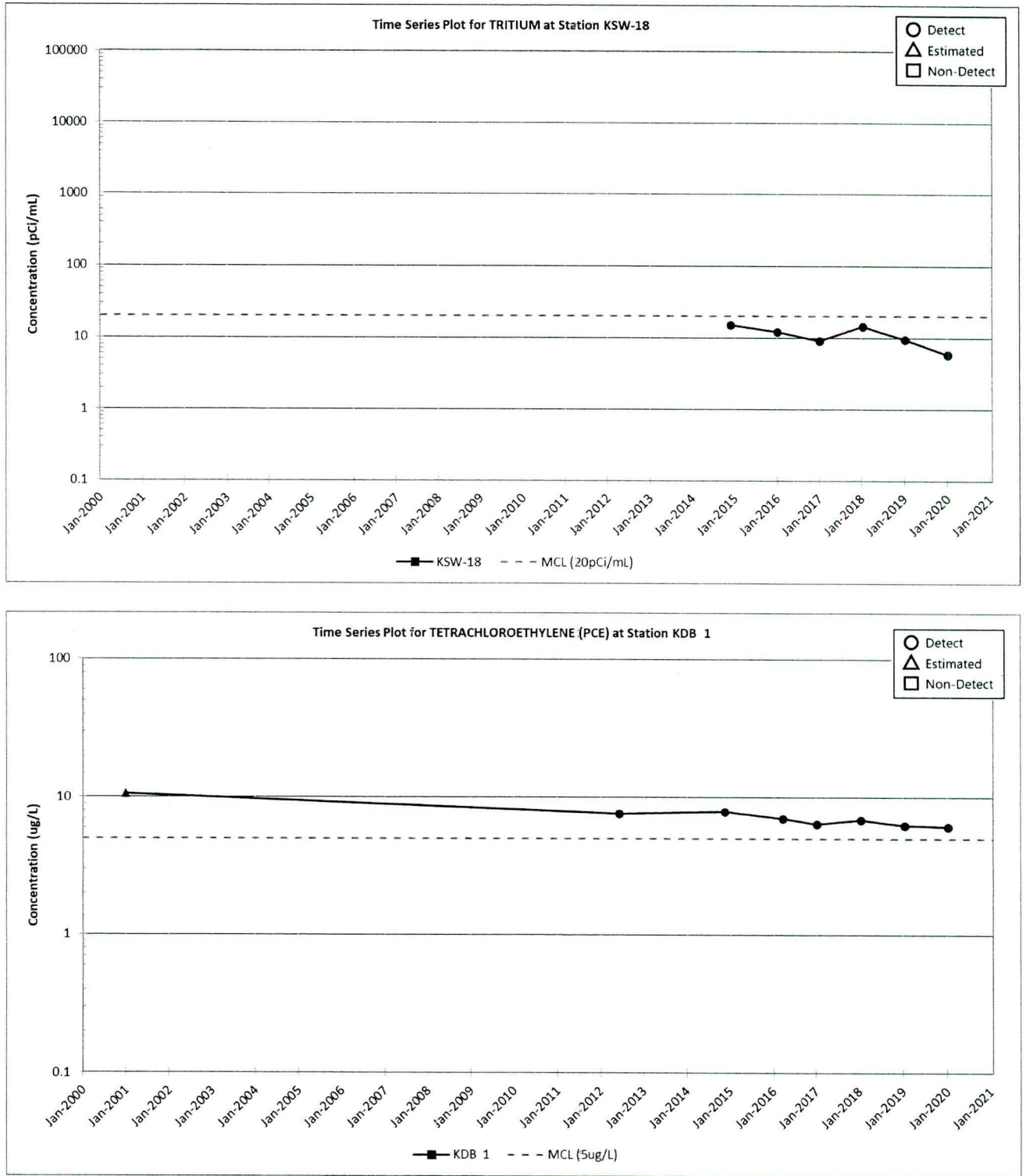


Figure 8: Tritium Concentration Trends at Surface Water Station KSW-18 and PCE Concentration Trends at Well KDB 1

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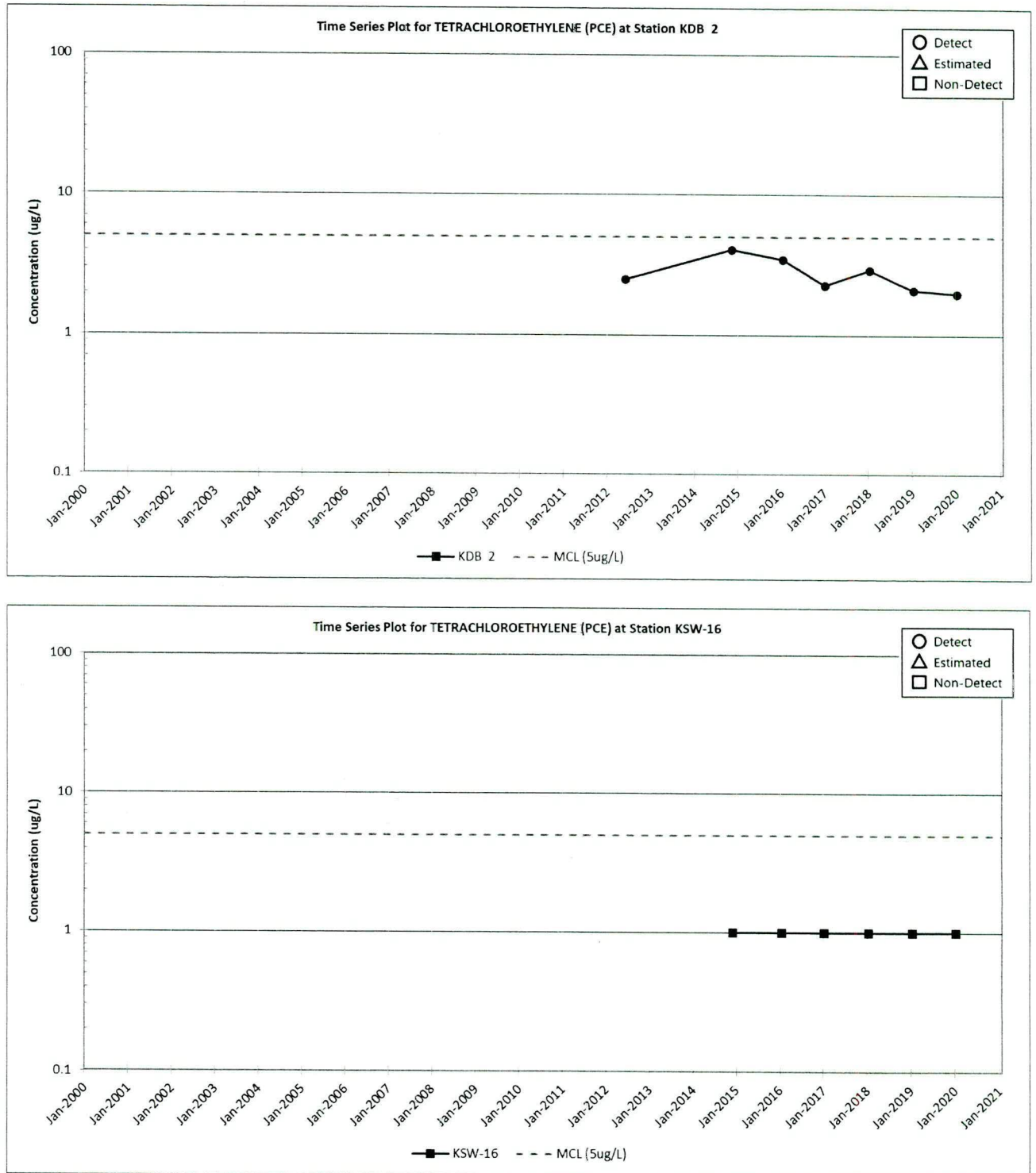


Figure 9: PCE Concentration Trends at Wells KDB 2 and Surface Water Station KSW-16

**Attachment 1.
KAGW 5-Year Data
Table
2016 through 2020**

			Field Data									KAGW OU Analytical					
Station	Well Use	Aquifer Zone	SAMPLE COLLECTION DATE	DEPTH TO WATER	SAMPLING EVENT WATER ELEVATION	PH	TOTAL ALKALINITY (AS CaCO3)	SPECIFIC CONDUCTANCE	FLOW RATE	TURBIDITY	Constituent	Comment	TRITIUM	TRICHLOROETHYLENE (TCE)	TETRACHLOROETHYLENE (PCE)	CIS-1,2-DICHLOROETHYLENE	CHLOROETHENE (VINYL CHLORIDE)
			day-month-year	ft	ft	pH	mg/L	uS/cm	gal/min	NTU	Unit			pCi/mL	ug/L	ug/L	ug/L
													20	5	5	70	2
KDB 1	Monitoring Well	UTRA	31-Mar-2016	67.7	205.6	5.6	19	118	0.5	12.2			2.69	<EQL (1)	7.05	<EQL (1)	<EQL (1)
KDB 1	Monitoring Well	UTRA									Lab Duplicate		2.33				
KDB 1	Monitoring Well	UTRA	18-Jan-2017	68.31	204.99	5.6	13	114	0.1	0.8			3.77	<EQL (1)	6.47	<EQL (1)	<EQL (1)
KDB 1	Monitoring Well	UTRA	23-Jan-2018	69.42	203.88	5.8	15	131	0.1	0.7			5.07	<EQL (1)	6.92	<EQL (1)	<EQL (1)
KDB 1	Monitoring Well	UTRA									Lab Duplicate		4.12				
KDB 1	Monitoring Well	UTRA	28-Jan-2019	66.63	206.67	5.6	11	142	0.1	1.2			4.1	<EQL (1)	6.33	<EQL (1)	<EQL (1)
KDB 1	Monitoring Well	UTRA	22-Jan-2020	67.8	205.5	5.7	0	118	0.2	0.5			6.67	<EQL (1)	6.14	<EQL (1)	<EQL (1)
KDB 2	Monitoring Well	UTRA	27-Jan-2016	70.8	202.9	4.3	0	36	1	2			446	2.79	3.49	<EQL (1)	<EQL (1)
KDB 2	Monitoring Well	UTRA	18-Jan-2017	70.7	203	5.3	8	42	1	0.5			389	2.17	2.3	<EQL (1)	<EQL (1)
KDB 2	Monitoring Well	UTRA	23-Jan-2018	71.58	202.12	5.5	9	38	1	0.7			259	2.1	2.93	<EQL (1)	<EQL (1)
KDB 2	Monitoring Well	UTRA	28-Jan-2019	69.22	204.48	5.2	0	39	1	0.6			126	1.34	2.12	<EQL (1)	<EQL (1)
KDB 2	Monitoring Well	UTRA	22-Jan-2020	70.3	203.4	5.1	0	37	1	0.5			96.2	1.53	1.99	<EQL (1)	<EQL (1)
KDB 3	Monitoring Well	UTRA	27-Jan-2016	69.8	203.7	5.4	0	260	0.5	7.7			3.05	NS	NS	NS	NS
KDB 3	Monitoring Well	UTRA	18-Jan-2017	69.64	203.86	6	48	321	0.5	8.7			2.19	NS	NS	NS	NS
KDB 3	Monitoring Well	UTRA	07-Feb-2018	70.8	202.7	6	62	310	0.5	13.3			1.72	NS	NS	NS	NS
KDB 3	Monitoring Well	UTRA									Lab Duplicate		1.66				
KDB 3	Monitoring Well	UTRA	28-Jan-2019	68	205.5	6.2	29	265	0.5	3			3.97	NS	NS	NS	NS
KDB 3	Monitoring Well	UTRA									Lab Duplicate		3				
KDB 3	Monitoring Well	UTRA	22-Jan-2020	69.1	204.4	6.8	111	270	1	10.4			3.56	NS	NS	NS	NS
KDB 4	Monitoring Well	UTRA	27-Jan-2016	70.4	202.8	4.7	0	22	0.2	0.9			12	NS	NS	NS	NS
KDB 4	Monitoring Well	UTRA	18-Jan-2017	70.3	202.9	4.9	0	20	0.1	0.5			11.5	NS	NS	NS	NS
KDB 4	Monitoring Well	UTRA	23-Jan-2018	71.4	201.8	5.7	11	21	0.1	0.4			9.59	NS	NS	NS	NS
KDB 4	Monitoring Well	UTRA	28-Jan-2019	68.81	204.39	5.2	6	38	0.1	0.6			12.8	NS	NS	NS	NS
KDB 4	Monitoring Well	UTRA	22-Jan-2020	70.1	203.1	5.3	0	22	0.2	0.5			11.4	NS	NS	NS	NS
KDB 5	Monitoring Well	UTRA	03-Feb-2016	67.71	202.69	5.1	3	25	0.3	4.4			<EQL (0.925)	NS	NS	NS	NS
KDB 5	Monitoring Well	UTRA	19-Jan-2017	67.9	202.5	4.8	0	31	0.3	7.2			<EQL (0.99)	NS	NS	NS	NS
KDB 5	Monitoring Well	UTRA	23-Jan-2018	69	201.4	5.4	7	33	0.5	9.7			<EQL (1.4)	NS	NS	NS	NS
KDB 5	Monitoring Well	UTRA	23-Jan-2019	66.4	204	5.4	6	33	0.5	10.1			<EQL (1.33)	NS	NS	NS	NS
KDB 5	Monitoring Well	UTRA	22-Jan-2020	67.8	202.6	6.4	0	33	0.5	16.6	X		<EQL (1.32)	NS	NS	NS	NS
KRB 19D	Monitoring Well	UTRA	14-Jan-2016	81.1	200.8	4.3	0	32	0.5	0.7			5240	NS	NS	NS	NS
KRB 19D	Monitoring Well	UTRA	18-Jan-2017	81	200.9	4.8	0	33	1	0.6			3430	NS	NS	NS	NS
KRB 19D	Monitoring Well	UTRA	23-Jan-2018	81.8	200.1	5	0	30	1	3.5			2210	NS	NS	NS	NS
KRB 19D	Monitoring Well	UTRA	28-Jan-2019	79.54	202.36	5	0	33	0.5	3.8			2570	NS	NS	NS	NS
KRB 19D	Monitoring Well	UTRA	22-Jan-2020	80.5	201.4	5.3	0	28	0.5	4.5	X		2090	NS	NS	NS	NS
KSW-01	Surface Water		14-Jan-2016	NS	NS	6.4	4	21	NS	2.8			<EQL (1.19)	NS	NS	NS	NS
KSW-01	Surface Water		18-Jan-2017	NS	NS	NS	NS	NS	NS	NS			[0.971]	NS	NS	NS	NS
KSW-01	Surface Water		22-Jan-2018	NS	NS	6.9	2	20	NS	7.7			[0.543]	NS	NS	NS	NS
KSW-01	Surface Water										Lab Duplicate		[0.589]				
KSW-01	Surface Water		23-Jan-2019	NS	NS	6.8	4	20	NS	3.5			<EQL (1.5)	NS	NS	NS	NS
KSW-01	Surface Water		22-Jan-2020	NS	NS	6.1	6	21	NS	1.9			<EQL (1.37)	NS	NS	NS	NS
KSW-05	Surface Water		14-Jan-2016	NS	NS	6.3	14	44	NS	14			51.5	NS	NS	NS	NS
KSW-05	Surface Water		18-Jan-2017	NS	NS	6.4	8	30	NS	8.4			9.61	NS	NS	NS	NS
KSW-05	Surface Water		22-Jan-2018	NS	NS	6.6	8	39	NS	7.3			21.3	NS	NS	NS	NS
KSW-05	Surface Water		23-Jan-2019	NS	NS	6.4	19	65	NS	6.6			26.2	NS	NS	NS	NS
KSW-05	Surface Water		22-Jan-2020	NS	NS	6.2	8	41	NS	5.8			37.3	NS	NS	NS	NS
KSW-06	Surface Water		14-Jan-2016	NS	NS	6.5	5	26	0.6661*	8.7			146	NS	NS	NS	NS
KSW-06	Surface Water		18-Jan-2017	NS	NS	6.6	5	25	0.5834	12.8			121	NS	NS	NS	NS
KSW-06	Surface Water		22-Jan-2018	NS	NS	7	4	27	0.39	5.6			154	NS	NS	NS	NS
KSW-06	Surface Water		23-Jan-2019	NS	NS	6.8	8	28	1.26	6.2			99.3	NS	NS	NS	NS
KSW-06	Surface Water		22-Jan-2020	NS	NS	6.2	4	29	0.9374	7.4			76.4	NS	NS	NS	NS
KSW-07	Surface Water		14-Jan-2016	NS	NS	7.6	12	51	NS	5.9			72.5	NS	NS	NS	NS
KSW-07	Surface Water		18-Jan-2017	NS	NS	6.4	13	61	NS	7.2			59.6	NS	NS	NS	NS
KSW-07	Surface Water		22-Jan-2018	NS	NS	6.8	7	52	NS	3.9			95.4	NS	NS	NS	NS
KSW-07	Surface Water		23-Jan-2019	NS	NS	6.4	11	52	2.13	4.9			57.6	NS	NS	NS	NS
KSW-07	Surface Water		22-Jan-2020	NS	NS	6.2	10	52	NS	7.4			40.2	NS	NS	NS	NS
KSW-16	Surface Water		27-Jan-2016	NS	NS	6.2	18	64	NS	3.9			79.4	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
KSW-16	Surface Water		18-Jan-2017	NS	NS	5.6	18	68	NS	9.2			70	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
KSW-16	Surface Water		22-Jan-2018	NS	NS	6.7	27	63	NS	4.6			105	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
KSW-16	Surface Water		23-Jan-2019	NS	NS	6	13	58	2.23	4			64.8	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
KSW-16	Surface Water										Lab Duplicate		65.3				
KSW-16	Surface Water		22-Jan-2020	NS	NS	6.6	12	59	NS	4.5			51.4	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
KSW-17	Surface Water		14-Jan-2016	NS	NS	7.4	12	49	22.7433*	3.5			15.5	NS	NS	NS	NS
KSW-17	Surface Water		18-Jan-2017	NS	NS	5.5	6	52	35.1966	5.6			13.2	NS	NS	NS	NS
KSW-17	Surface Water		22-Jan-2018	NS	NS	6.6	8	57	8.76	3.3			18.2	NS	NS	NS	NS
KSW-17	Surface Water		23-Jan-2019	NS	NS	5.1	9	42	18.05	4.1			11.3	NS	NS	NS	NS
KSW-17	Surface Water		22-Jan-2020	NS	NS	6.3	6	43	12.9424	3.7			8.29	NS	NS	NS	NS
KSW-18	Surface Water		14-Jan-2016	NS	NS	7.8	16	55	NS	3.8			12.1	NS	NS	NS	NS
KSW-18	Surface Water		18-Jan-2017	NS	NS	5	0	55	44.6681	6.8			9.04	NS	NS	NS	NS
KSW-18	Surface Water		22-Jan-2018	NS	NS	6.4	8	64	10.93	4.1			14.6	NS	NS	NS	NS
KSW-18	Surface Water		23-Jan-2019	NS	NS	5.2	14	49	25.89	5.7			9.52	NS	NS	NS	NS
KSW-18	Surface Water		22-Jan-2020	NS	NS	5.8	6	40	20.699	5.3			5.81	NS	NS	NS	NS

Explanation

##	EPA Functional Guideline Code of 'J' was applied to the result, indicating an estimated quantity.
<EQL(##)	Constituent was below detection. The sample-specific Estimated Quantitation Limit is in parentheses.
REJ	Result exceeds applicable limit.
REJ	Result Rejected.
	Result is less than the applicable limit and without EPA Functional Guideline qualifiers.
NS	Requested to be sampled but was not.
Blue Text	Not a required sample analysis.
X	Well went dry during purging; samples collected after well recovered measurements obtained.
*	Stream flow measurement estimated by averaging 4Q2014 and 1Q2017 measurements.